Roadmap for Data Centre Operators

techUK

Understanding compliance obligations for combustion plant emissions

Does your site have combustion plant – such as standby generators?

NO

NO RESTRICTIONS

YES

Calculate thermal input to each generator and aggregate for each site

Are any generators above 1MW thermal input?

YES

NO

NO RESTRICTIONS

Is the aggregated input above 20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth

MCPD

Is the aggregated input above 50MW thermal?

YES

NO

NO

NO

>20MWth (individual plant)

LA Permit

EPR - UK only

YES

>50MWth

EA Permit

EPR / IED

>20MWth in units >3MWth

EU ETS

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Emma Fryer, 2015

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Thermal input (MWth/MW thermal):
Thermal input means the rate at which fuel can be burned at the maximum continuous rating of the appliance multiplied by the net calorific value of the fuel and expressed as megawatts thermal. This is an unfamiliar concept to many data centre operators because they think of generating capacity in terms of electrical output and not thermal input. We need to know the thermal input to understand the emissions associated with the generator. To work out the thermal input for a generator you need to look at the generator plate or the manufacturer's specification. As a broad rule of thumb, generators are between 30% and 40% efficient, so you need to multiply the electrical capacity by about three to give you an idea of thermal input.

BACK

Calculate thermal input [illegible] each generator and aggregate for each site

Are any generators above 1MW thermal input?

YES

NO

NO RESTRICTIONS

Is the aggregated input above 20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

Is the aggregated input above 50MW thermal?

YES

NO

>20MWth (individual plant)
LA Permit
EPR - UK only

>50MWth
EA Permit
EPR / IED

>20MWth in units >3MWth
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1MW thermal

1MW thermal input is approximately equivalent to a generator with 0.3MW electrical output. Data centres are unlikely to have much generating plant below this threshold so you can generally assume that your facilities will be covered under MCPD. That said, there are certain exemptions for standby capacity that is used for under 500 hours per year.

If you have queries relating to MCPD and its transposition into UK law, look for the MCPD link on the main roadmap or contact emma.fryer@techuk.org

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>50MWth
EA Permit
EPR / IED

Calculate thermal input to each generator and aggregate for each site

Are any generators above 1MW thermal input?

YES

NO

NO RESTRICTIONS

Is the aggregated input above 20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

Is the aggregated input above 50MW thermal?

YES

NO

NO

NO

>20MWth (individual plant)
LA Permit
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>20MWth in units >3MWth
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This is a tricky area. "Aggregated" means that you add up the capacity of your generators in MW thermal across the site. However, different regulations take different approaches to aggregation:

- EU ETS requires only units of 3MWth and above to be included in the aggregation to establish whether a site is obliged, but once a site is obliged, all units have to be aggregated for the purposes of calculating emissions and buying allowances.
- EPR however (for sites under 50MW thermal) is based on individual units above or equal to 20MW thermal and not aggregated capacity. But once you get to sites above 50MW thermal the rules change again. There is a lot of inconsistency between policy tools, so you need to be very vigilant. If in doubt seek professional advice or approach the Environment Agency directly.

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>50MWth
EA Permit
EPR / IED

Calculate thermal input to each generator and aggregate for each site

Are any generators above 1MW thermal input?

YES

NO

NO RESTRICTIONS

Is the aggregated input above 20MW thermal?

Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

Is the aggregated input above 50MW thermal?

YES

NO

>20MWth (individual plant)
LA Permit
EPR - UK only

NO

>20MWth in units >3MWth
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50MWth

For sites where the thermal input is above 20MWth but below 50MWth a lot of regulations apply. Sites with any **individual** plant equal to or above 20MWth have to apply to their local authority for a permit to use that plant. Those with **aggregated** capacity of above 20MWth in units of 3MWth and above are obliged under EU ETS. Above 50MWth sites are captured under the Industrial Emissions Directive (IED) and enter a whole new world of regulatory pain. See EA Permit. The landscape will change soon with MCPD which will to some extent supersede the local authority permit requirements under EPR. MCPD is being transposed so there is some uncertainty regarding the final details, in particular who will regulate it. See the link on the main roadmap for more information on MCPD.

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>50MWth
EA Permit
EPR / IED

Calculate thermal input to each generator and aggregate for each site

Are any generators above 1MW thermal input?

YES

NO

NO RESTRICTIONS

Is the aggregated input above 20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

Is the aggregated input above thermal?

50MW

YES

NO

>20MWth (individual plant)
LA Permit
EPR - UK only

YES

NO

>20MWth in units >3MWth
EU ETS

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EA Permit (EPR – Environmental Permitting Regulations transposing the IED – Industrial Emissions Directive and regulated by the EA - Environment Agency):

Sites where the generating capacity is above 50MWth must apply to the Environment Agency for a permit to operate the generators. There are more stringent requirements regarding potential air quality impacts that work on the basis that the generators are active rather than on standby. The resultant fees and licences are costly. For some sites, particularly those near SSSIs, those that have underground oil storage tanks or that participate in STOR (or other demand response schemes that may require greater generator activity), compliance requirements under EPR / IED can be very expensive bags of worms. We would advise operators of such sites to seek professional help.

Operators running sites with standby capacity above 15MWelec should check carefully to see if IED applies. To find out whether a site is obliged under IED see our guidance: **IED: IN or OUT?**

This is part of the UK's implementation of the Industrial Emissions Directive: **http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm**.
The legislation is here: **http://www.legislation.gov.uk/ukdsi/2010/9780111491423/contents**
and DEFRA guidance is also available: **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221044/pb13898-epr-guidance-part-a-130222.pdf**

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> 50MWth
EA Permit
EPR / IED

YES

YES

>20MWth in units >3MWth
EU ETS

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NO RESTRICTIONS

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NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

>20MWth (individual plant)
LA Permit
EPR - UK only

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EUETS: EU Emissions Trading Scheme:

This European cap and trade scheme has been in place since 2005 and is now in its third phase, which started on 1 Jan 2013. Standby capacity is now included in EU ETS even if those generators are rarely used, so large data centres may be captured. EU ETS applies to all generating capacity where units of 3MWth and over add up to more than 20MWth. So a site with 6 generators of 4MWth each would be captured but a site with 12 generators of 2MWth each would not be captured under the scheme. The ETS is cumbersome and expensive to comply with and has generated a lot of confusion among data centre operators. See our briefings on EU ETS: **https://www.techuk.org/insights/meeting-notes/item/896-inclusion-criteria-for-phase-iii-of-eu-ets** and our notes on the relationship between EU ETS, CRC and CCAs: **https://www.techuk.org/images/documents/Data_Centres_-_CCA/Note_01d_EUETS_CRC_and_CCA_and_er_data_centres.pdf**

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for each site

input?

Be careful!

thermal?

YES

YES

NO

NO

NO

NO

NO

>50MWth
EA Permit
EPR / IED

>20MWth in units >3MWth
EU ETS

NEW ROAD LAYOUT AHEAD

NO RESTRICTIONS

>1MWth and <50MWth
MCPD

>20MWth (individual plant)
LA Permit
EPR - UK only

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LA Permit (EPR – Environmental Permitting Regulations, UK requirements regulated by LA - Local Authorities):

Sites where the generating capacity of individual plant is equal to or over 20MWth must apply to the Local Authority for a permit to operate those generators. This is part of Environmental Permitting Regulations (EPR) which is a UK specific regulatory initiative aimed at reducing air pollution. Local authorities should provide guidance. This will be superseded by the MCPD (See above) DEFRA leads and has produced guidance: **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221044/pb13898-epr-guidance-part-a-130222.pdf**

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>50MWth
EA Permit
EPR / IED

thermal input to each generator and aggregate for each site

above 1MW thermal input?

YES

NO

NO RESTRICTIONS

input above 20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth
MCPD

input above 50MW thermal?

YES

NO

>20MWth (individual plant)
LA Permit
EPR - UK only

YES

NO

>20MWth in units >3MWth
EU ETS

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MCPD – AKA the Medium Combustion Plant Directive.

This is a new piece of legislation. Officially Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants. This applies to ALL generators between 1MWth and 50MWth. There is provision to exempt existing standby generators from most of the requirements but it is not yet clear whether DEFRA will implement this concession for diesel generators. New plant will have to be compliant. The Directive is being transposed and will be effective in the UK by 2018 with some measures following later. NB this will supersede the Environmental Permitting Regulations applying to plant between 20MWth and 50MWth **http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.313.01.0001.01.ENG&toc=OJ:L:2015:313:TOC**

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each generator and aggregate for each site

1MW thermal input?

YES

NO

NO RESTRICTIONS

20MW thermal? Be careful!

YES

NO

NEW ROAD LAYOUT AHEAD

>1MWth and <50MWth

MCPD

50MW thermal?

YES

NO

NO

NO

>20MWth (individual plant)

LA Permit

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>50MWth

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What does all this mean?

Data centres depend on electricity but operators usually install standby generators to provide power supply in the event of mains power failure or other interruptions to supply. These generators are very rarely used because the UK grid is relatively reliable, although they are regularly tested to ensure that, should they be needed, they will work. Because data centres are energy intensive, the sector is characterised by relatively high generating capacity but very low run time and very low emissions.

Generators are combustion plant and therefore attract various forms of regulation, some targeted at reducing carbon emissions, such as EU ETS, and some targeted at improving air quality, such as the IED (Industrial Emissions Directive) and its equivalent UK instrument after transposition, EPR (Environmental Permitting Regulations). Obligations under these regulatory schemes are dictated by generating capacity rather than emissions, so data centres are often captured by legislation that is really aimed at much larger emitters. The roadmap above provides very basic guidance to this particular compliance landscape. A short explanation of each of the instruments mentioned on the roadmap is provided below, plus links to relevant information.

Policy context

The landscape looks very complex from an operator perspective but this is because it has evolved over time, and represents both UK and EU initiatives. Briefly, this is how it all fits together:
The IED or Industrial Emissions Directive is a European policy instrument focused on emissions and air quality. This is transposed into UK legislation through EPR – Environmental Permitting Regulations. EPR (and therefore IED) are enforced by the Environment Agency (EA). However, EPR are much broader than IED and include all forms of emissions such as water and other waste like slag or ash. The idea was to be able to handle all these emissions in a consistent way. EPR cover generating capacity from 20MWth and above. However, the regulations covering sites with generating capacity between 20MWth and 50MWth are UK only and are handled through local authorities. So operators have to apply locally for permits within this range. Feedback suggests that experiences vary: some authorities have specialist expertise and others do not, so operators with multiple sites can find the approach inconsistent. For sites above 50MWth the IED applies, implemented through EPR, and operators must apply to the EA for a permit, so the handling should be more consistent. In Scotland, all the EPR permits are handled through SEPA (Scottish Environment Protection Agency) irrespective of whether the sites are over or under 50MWth.

Recent Developments

The most recent development is the MCPD, the Medium Combustion Plant Directive. At time of writing this has just been signed off by the Commission and the next stage is to transpose it into UK legislation. MCPD will cover all sites with capacity between 1MWth and 50MWth and will supersede the EPR in the UK for sites between 20MWth and 50MWth. For sites above 50MWth the situation is unchanged. DEFRA has yet to decide whether local authorities or the EA will regulate.

Further information

The other yellow tabs list the different instruments mentioned on the diagram and provides relevant information and links. On the final page there is an extract from the Environment Agency Guidelines to EPR that sets out their approach to interpreting the legislation for data centre standby generation. Data centres are mentioned specifically (see red text).

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Definitions and Terminology

EPR: Environmental Permitting Regulations (UK). EPR cover all forms of emissions but as far as data centres are concerned they principally relate to air quality issues resulting from generator use. EPR is the UK interpretation of the Industrial Emissions Directive (IED) but it is considerably broader, covering generator plant at lower aggregated thresholds than the IED. If the individual plant capacity is over 20MWth but below 50MWth then the local authority regulates. If the aggregated capacity is above 50MWth then the EA must regulate. See the different approaches to permitting below. EPR also accommodates elements from the Energy Efficiency Directive (EED) but these provisions exempt plant planned to operate few than 1500 hours per year on a rolling average of 5 years, so data centres are unlikely to be obliged. For more information see: http://www.legislation.gov.uk/ukdsi/2015/9780111126028/regulation/6)

EA Permit (UK) Part of EPR – Environmental Permitting Regulations transposing the IED – Industrial Emissions Directive and regulated by the EA - Environment Agency. Sites where the generating capacity is above 50MWth must apply to the Environment Agency for a permit to operate the generators. There are more stringent requirements regarding potential air quality impacts that work on the basis that the generators are active rather than on standby. The resultant fees and licences are costly. For some sites, particularly those near SSSIs, those that have underground oil storage tanks or that participate in STOR (or other demand response schemes that may require greater generator activity), compliance requirements under EPR / IED can be very expensive bags of worms. We would advise operators of such sites to seek professional help.
This is part of the UK's implementation of the Industrial Emissions Directive. The legislation is here: and DEFRA guidance is also available.

LA Permit (UK) Part of EPR – Environmental Permitting Regulations, UK requirements regulated by LA - Local Authorities. Sites where the generating capacity of individual plant is equal to or over 20MWth must apply to the Local Authority for a permit to operate those generators. This is part of Environmental Permitting Regulations (EPR) which is a UK specific regulatory initiative aimed at reducing air pollution. Local authorities should provide guidance. This will be superseded by the MCPD (See above) DEFRA leads and has produced guidance.

IED: Industrial Emissions Directive (EU): The IED is a European policy instrument focused on emissions and air quality. To find out if you are obliged under IED see our notes **"IED: IN or OUT?"** This is transposed into UK legislation through EPR – Environmental Permitting Regulations with the help of **BATs (Best Available Techniques) and BREFs (BAT Reference Documents)**. These documents are developed under IED and are the main reference documents used by regulators in member states when issuing permits and licences for IED activities. The Irish EPA provides a good definition here. There is no BAT for data centres but the Environment Agency is working with techUK to develop one. Contact emma.fryer@techuk.org for more information.

EU ETS: EU Emissions Trading Scheme (EU): This European cap and trade scheme has been in place since 2005 and is now in its third phase, which started on 1 Jan 2013. Standby capacity is now included in EU ETS even if those generators are rarely used, so large data centres may be captured. EU ETS applies to all generating capacity where units of 3MWth and over add up to more than 20MWth. So a site with six 4MWth generators is captured but a site with 12 2MWth generators is not. The ETS is cumbersome and expensive to comply with and operators are confused. See our briefing on EU ETS, our Council position and our notes on the relationship between EU ETS, CRC and CCAs.

MCPD: Medium Combustion Plant Directive (EU) This is a new piece of EU legislation. Officially Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants. This applies to ALL generators between 1MWth and 50MWth. There is provision to exempt existing standby generators from most of the requirements but it is not yet clear whether DEFRA will implement this concession for diesel generators. New plant will have to be compliant. The Directive is being transposed and will be effective in the UK from 2018. **NB this will supersede the Environmental Permitting Regulations applying to plant between 20MWth and 50MWth.**

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Guidance from the EA

Identifying regulated facilities and interpreting capacity and aggregation: Extract from Environment Agency Guidance on EPR

The Environment Agency Regulatory Guidance on understanding how to define a regulated facility is a good source of information. See https://www.gov.uk/government/collections/regulatory-guidance-series-environmental-permitting and look for Regulatory Guidance Note 2 and then open the Appendices 1&2 to that document or just use this link: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/435475/LIT_6529.pdf. This is a useful document explaining how the regulations should be interpreted and is your primary reference point. These notes only provide rules of thumb. The key areas covered by the EA Regulatory Guidance are:

1. Information on how to aggregate generating units on sites. the relevant extract is included below:
2. An explanation of the way that standby generation will be addressed. In this extract page 22, note 1.1.9, data centres are mentioned specifically

Aggregation: Interpretation and application of Part A(1)
1. For the purpose of paragraph (a), where two or more appliances with an aggregate rated thermal input of 50 megawatts or more are operated on the same site by the same operator those appliances must be treated as a single appliance with a rated thermal input of 50 megawatts or more.

Note 1.1.6: This aggregation rule, specific to Section 1.1 Part A(1)(a), is slightly different to the general aggregation rule in para. 4 of Part 1 of Schedule 1 (see General Note 1). The effect of this specific rule is not only to aggregate the capacities of the separate combustion units, but also to treat them as a single appliance and thus as part of the same installation. In contrast, the general aggregation rule provides that the aggregate capacity is to be attributed to each part or unit, but does not require that the various units are considered to be part of the same installation. In most cases, however, similar units operated on the same site by the same operator will share common directly associated activities, which will make them part of the same installation in any case.

Note 1.1.7: Any appliance with a rated thermal input greater than 1MW should be included in the aggregation for the purposes of this specific rule. This creates the possibility of a Section 1.1 A(1) combustion activity existing at a relatively large installation with multiple, but individually small-scale, combustion units.

Note 1.1.8: Temporary Combustion Plant.
Only units which are permanently situated and operated on the site should be included in the aggregation. Equipment brought in during shutdowns, compression ignition generator sets, air compressors, reciprocating engine vehicles etc would not be included in the aggregation, nor would heaters brought in during cold spells or to temporarily replace units under repair.

Note 1.1.9: Interpretation of Capacity.
Installed capacity normally would include all combustion units, even those designated as standby plant. However, the following should be taken into account when considering capacity;

a) Physical Constraints: If fuel cannot be provided to all combustion units simultaneously, then capacity should be based on the maximum that can be fired at any one time. The physical constraint must be 'permanent' i.e. not easily reversible. In order to demonstrate that the unit/s cannot be operated at >50MWth input, they must be recertified by the manufacturer / installer and documentary evidence provided.

b) Software Constraints: If high level software interlocks are used to restrict fuel consumption, then the capacity should be based on the maximum that can be fired at any one time. Software interlocks must be protected to restrict access and be able to generate audit logs identifying any changes made. The software constraint must offer a clear and unambiguous demonstration that the unit/s cannot be operated at >50MWth input. The unit/s must be recertified by the manufacturer / installer and documentary evidence provided.

c) Data Centre emergency backup generation plant (EBGP) : The capacity is based on the maximum thermal input of units which can be fired at any one time, irrespective of the reason for firing. The limiting constraints are those listed in (a) and (b) above. Full power ratings can be quoted as continuous rating or standby duty rating. Standby duty units can run up to 110% of the continuous rating. For the purpose of determining the capacity it is the 'maximum' thermal input rating that can be achieved irrespective of whether the unit would not normally run at that level. In this case, 110% of the continuous rating shall be used.

Note 1.1.10: Interpretation of Capacity for the purposes of Chapter III of IED.

a) Combustion Plant <15MWTh
Article 29(3) of the IED states that: For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15MW shall not be considered. This aggregation rule differs from that for Chapter II in that there is a cut off, <15MWth, below which the rated thermal input is not considered. Moreover, Article 29(1) states: Where the waste gases of two or more separate combustion plants are discharged through a common structure the combination formed by such plants shall be considered as a single combustion plant and their capacities added for the purpose of calculating the total rated thermal input. Therefore, if the aggregated input of units, >15MWth, discharging through a common stack is >50MWth, it will constitute a Chapter III IED activity. By definition, this would also be a Chapter II IED activity.

b) Stand-by Generators
If stand-by generators (SBG) or supplementary firing apparatus (SFA) are only used in the case of an emergency or breakdown of other equipment and in all cases are substituting existing units, their rated thermal input will not be counted towards the calculation of the total. However, if the SBGs or SFAs are used to boost performance in certain cases (as well as at times substituting), they need to be counted towards the total calculation of the rated thermal input. Note, the exclusion of SBGs and SFAs from the above aggregation is unique to IED Chapter III combustion plants. It DOES NOT apply to IED Chapter II combustion activities. In most cases, SBGs or SFAs will be required to come on-line as a result of taking off-line the primary unit in a planned manner i.e. for planned preventative maintenance. In such events it is possible for the SBG or SFA to be fired simultaneously with the primary unit as the load is taken up by the SBG or SFA. Notwithstanding this, any such period of 'overlap' shall not be considered as 'boosting' the performance of the primary unit. Therefore, standby combustion plant means identified plant substituting thermal capacity for periods of plant maintenance, resilience or breakdown. Standby plant shall not be used to expand the primary operational thermal capacity of the nstallation.

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Roadmap for Data Centre Operators

Understanding compliance obligations for combustion plant emissions

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Does your site have combust… as stand…

YES

Calculat… thermal inp… each gener… and aggreg… for each s…

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For more information about the data centre programme please visit **www.techuk.org/datacentres**
For other publications see **www.techuk.org/datacentrepublications**

About techUK

techUK represents the companies and technologies that are defining today the world that we will live in tomorrow. 900 companies are members of techUK. Collectively they employ more than 800,000 people, about half of all tech sector jobs in the UK. These companies range from leading FTSE 100 companies to new innovative start-ups. The majority of our members are small and medium sized businesses. **www.techuk.org**

Disclaimer

This roadmap is only intended as an indicative guide and does not constitute legal advice.
For detailed guidance you should refer to the Environment Agency or seek professional help.

Acknowledgements

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